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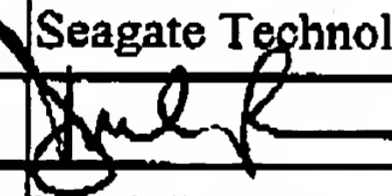
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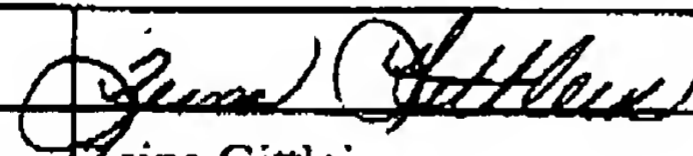
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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	10/602,791	
	Filing Date	June 24, 2003	
	First Named Inventor	William Leon Rugg	
	Art Unit	2653	
	Examiner Name	Julie Anne Watko	
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PATENTIN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	William L. Rugg et al.		
Serial No.:	10/602,791	Examiner:	J. Watko
Filed:	June 24, 2003	Group Art Unit:	2653
Title:	Disc Drive Apparatus Having Drive Electronics Top Mounted on Flexible Printed Circuit Board		
Docket No.:	STL10987		

AMENDED APPEAL BRIEF

This Amended Appeal Brief is provided in response to the "Notification of Non-Compliant Appeal Brief" mailed October 19, 2006. In that Notification it was stated that Appellant had failed to provide an Evidence Appendix or a Related Proceedings Appendix. The Appeal Brief is hereby amended in a *bona fide* effort to remedy these apparently critical deficiencies. Entry and consideration of this Amended Appeal Brief is therefore respectfully requested.

This appeal is filed in response to the final Office action mailed June 7, 2006 (hereinafter "the Final Action").

(1) Real party in interest

The real party in interest is Seagate Technology LLC.

(2) *Related appeals and interferences*

There are no related appeals or interferences.

(3) Status of Claims

Pending claims 1-6, 8-13, 16 and 20 stand rejected and are hereby appealed.

Claims 7, 14, 15 and 17-19 stand objected to as including allowable subject matter but depending from rejected base claims.

(4) Status of Amendments after Final

No amendments were filed after final rejection.

(5) Summary of Claimed Subject Matter

Regarding claim 1, as described in the specification from page 4, line 6 through page 6, line 26 and depicted in FIGs. 1 and 2, one embodiment of the present invention may be summarized as a data storage device (such as 102) comprising base plate (such as 104) having a top surface, a spindle motor (such as 106) positioned on the top surface of the base (such as 104) supporting one or more data storage discs (such as 108) for rotation on the spindle motor (such as 106), an actuator assembly (such as 110) positioned on the top surface of the base plate (such as 102) adjacent the data storage disc (such as 108) and a flex printed circuit board assembly (such as 130) on the top surface of the base plate (such as 102) having actuator and motor electronic control components (such as 132, 133, 134) thereon on the top surface of the base (such as 102).

Regarding claim 12, as described in the specification from page 4, line 6 through page 6, line 26 and depicted in FIGs. 1 and 2, another embodiment of the present invention may be summarized as a flexible printed circuit assembly (such as 130) for use in a data storage device (such as 100) having an actuator assembly (such as 110) adjacent a spindle motor (such as 106) rotating one or more data storage discs (such as 108), the assembly comprising a flexible printed circuit (such as 131) having a pigtail lead (such as 164) for connection to the actuator assembly (such as 110) of the data storage device (such as 110) and a pigtail lead (such as 162) for connection to the spindle motor (such as 106) of the data storage device actuator control and signal processing electronics components (such as 132, 133, 134) mounted on, and electrically connected to, the flexible printed circuit (such as 131), and a stiffener plate (such as 140) coextensive with a portion of the flexible printed circuit (such as 131) forming a ground plane for the components (such as (132, 133, 134) on the flexible printed circuit (such as 131).

Regarding claim 16, as described in the specification from page 4, line 6 through page 6, line 26 and depicted in FIGs. 1 and 2, another embodiment of the present invention may be summarized as a printed circuit assembly comprising a flexible printed circuit (such as 131) having one or more electronic circuit components (such as

132, 133, 134) requiring a ground and a power connection mounted thereon and a stiffener plate (such as 140) coextensive with a portion of the flexible printed circuit (such as 131) forming a ground plane connected to the one or more components (such as 132, 133, 134).

(6) *Grounds of Rejection to be Reviewed on Appeal*

(1) Claims 1, 2, 4, 5 and 8 stand rejected under 35 U.S.C. § 103(a) as being obvious over European Patent Application EP 0 760 510 (hereinafter "the EP document") in view of U.S. Patent 6,797,882 to Crane, Jr. et al. (hereinafter "Crane").

(2) Claims 3 and 9-11 stand rejected under 35 U.S.C. § 103(a) as being obvious over the EP document in view of Crane and U.S. Patent 6,243,262 to Koo (hereinafter "Koo").

(3) Claims 6, 12 and 13 stand rejected under 35 U.S.C. § 103(a) as being obvious over the EP document in view of Crane and U.S. Patent 6,388,834 to Bennett (hereinafter "Bennett").

(4) Claims 16 and 20 stand rejected under 35 U.S.C. § 103(a) as being obvious over Bennett in view of Crane.

(7) Argument

Rejection (1):

Claims 1, 2, 4, 5 and 8 stand rejected under 35 U.S.C. § 103(a) as being obvious over the EP Document in view of Crane.

Claim 1 recites, among other limitations, a "data storage device" comprising "a flex printed circuit board assembly" with "actuator and motor electronic control components thereon." The Final Action does not include a description of the rejection but refers to the Office action of February 1, 2006. The Office acknowledges on page 2 of that response that while the EP document discloses a disc drive having a printed circuit board 21 with control components mounted thereon, the circuit board is not disclosed to be a flex printed circuit board. In fact, given that the inventors of the device of the EP Document were perfectly capable of specifying a flex printed circuit board assembly when necessary (see, e.g., "flexible printed circuit board" 14), it is clear that circuit board 21 is a conventional rigid printed circuit board. To remedy this critical deficiency of the EP Document, the Office points to Crane as purportedly teaching substituting a flexible printed circuit board for the rigid board disclosed by the EP document.

Crane discloses that a flexible printed circuit extending from a die package may be attached to a printed circuit board or, in the alternative, provided with a stiffener instead. However, the Office has failed to disclose elimination of a printed circuit board within a disc drive. In particular, neither the Office nor Crane offer any clue as to how such a feat would be accomplished in a hard disc drive such as the one disclosed by the EP Document. For example, the EP document specifies in col. 8, lines 40-42 that "integrated circuit elements . . . are mounted on both surfaces of the circuit board 21." Use of a stiffener with a flex circuit having components on each side would be a practical impossibility, as the Office is surely aware. Conversely, the present application specifies that IC components must be mounted only on the top of the flex circuit to accommodated use of the stiffener (see, e.g., page 8, line 28 through page 9, line 4).

It is further noted that the EP document goes into tremendous details describing numerous ways in which to overcome the difficulties involved in connecting the motor and actuator flex circuits with the rigid board 21 as well as drive housing features designed specifically to accommodate rigid printed circuit boards (see, e.g., col. 8, lines 38-45; col. 11, line 19 through col. 12, line 25; col. 13, line 46 through col. 14, line 9). It is ironic that the Office has chosen the EP document, which so completely relies on the use of a rigid board, as a basis for eliminating the rigid board altogether. It is clear that in fact the EP document itself teaches away from any such modification.

It is further noted that the flex circuit/stiffener arrangement so vaguely disclosed by Crane has no particular structure. While it seems clear that Crane may teach that such a substitution may be made for the purpose of connecting a die package to a substrate, it is equally clear that Crane in no way envisioned replacement of the EP document's rigid printed circuit board, having actuator and motor electronic control components thereon, with a flexible printed circuit board. Nor would one of ordinary skill in the art have found such a modification obvious in light of Crane, particularly in light of the EP document's evident requirement of a rigid printed circuit board for mounting of actuator and motor control components.

Moreover, even if one were to accept the Office's suggestion that it was known that one could so modify the drive of the EP Document, the Office has utterly failed to provide a motivation for doing so. While it is baldly asserted that doing so "in order to simplify assembly by eliminating a connection step" is "notoriously well-known in the art," the Office has not produced a shred of evidence to support this claim. Crane, in fact makes no mention that doing so is well-known or that any particular benefit is thereby achieved.

The Office responded to this point on pages 4-5 of the Final action, pointing out that sources outside of the references being relied upon may be a source for motivation, and that in this case it was "reasoning from knowledge generally available to one of ordinary skill in the art." Appellant does not disagree that other sources may be relied upon; however, in this case the Office has failed to point out any source remotely

supporting the reasoning. While it is baldly asserted that this is "knowledge generally available" no evidence has been presented suggesting this is so. Moreover, while modifying the device of the EP document as proposed by the Office might eliminate a connection step, additional parts (e.g., stiffeners, ground and power planes, etc.) would likely need to be provided as well, as described in the present specification but of course entirely omitted from either of the references or the standing grounds of rejection. When these factors are taken into account, it becomes clear that the Office's "reasoning from knowledge generally available" is in actuality nothing more than speculation, engaged in purely from a perspective of hindsight. Such hindsight reasoning is impermissible.

It remains clear that the Office has merely used the present application as a road map for combining these disparate references solely for the purposes of rejecting the present claims. Reversal of the rejection of claim 1 and allowance thereof are respectfully requested.

Claims 2, 4, 5 and 8 depend from allowable claim 1 and are allowable for at least this reason; reversal of the rejection of these claims is also respectfully requested.

Rejection (2):

Claims 3 and 9-11 were rejected under 35 U.S.C. § 103(a) as being obvious over the EP document in view of Crane and Koo.

As set forth above with respect to claim 1, the EP document does not disclose a flex printed circuit board; nor does Crane render such an arrangement. Koo does not remedy this deficiency, nor does the Office attempt to assert that it does so. As such, claim 3 and 9-11 are allowable at least by virtue of their dependence from allowable claim 1.

Moreover, claim 3 further modifies claim 1 by requiring that "the actuator and motor electronic control components on the flex printed circuit board assembly are outside the enclosed space" formed by the disc drive base and cover. In the Office action of February 1, the Office seems to be suggesting that Koo discloses such an

arrangement. However, Koo does not explicitly show such an arrangement, as acknowledged by the Office on page 4 of that response, nor does Koo disclose any reason for doing so, understandable given that the arrangement does not appear to have been contemplated by Koo. Koo specifically provides a cutout 120a for heat dissipation; it's difficult to imagine why Koo would then proceed to place heat-generating components outside the cutout. Moreover, the EP Document goes to great lengths to provide circuit board 21 with means for sealing the disc drive enclosure from the inside (see col. 6, lines 46-54), yet the Office blithely suggests that the component somehow be placed outside of this housing.

In short, the Office here has proposed (a) impermissibly using Crane to substitute a flex circuit for a rigid circuit board; (b) then further modifying this circuit by placing portions outside the enclosure, as taught by (c) a reference which does not even disclose such an arrangement. Surely such a tenuous ground of rejection cannot reasonably be sustained.

Reversal of the rejection of claims 3, 9 and 11 is respectfully requested.

Rejection (3):

Claims 6, 12 and 13 were rejected under 35 U.S.C. § 103(a) as being obvious over the EP document in view of Crane and Bennett.

Like claim 1, independent claim 12 requires "a flexible printed circuit." As set forth above with respect to claim 1, the EP document does not disclose a flex printed circuit board, nor does Crane render such an arrangement. Bennett does not remedy this deficiency, nor does the Office attempt to assert that it does so. As such, the rejection of claim 12 cannot reasonably be sustained.

Moreover, Claim 12 requires "a stiffener plate coextensive with a portion of the flexible printed circuit forming a ground plane for the components on the flexible printed circuit," something clearly not contemplated by either the EP Document or Crane. The Office relies upon Bennett to remedy this critical deficiency, suggesting that it would have been obvious to further modify the modified EP document device by

providing a ground plane on the stiffener "to reduce read errors by producing an inexpensive an easily installed alternative pathway for EMI noise." However, Bennett does not disclose a stiffener that grounds any portion of the flex circuit or circuit board; the stiffener is designed only to provide a pathway for EMI noise by providing grounding contact between a disc drive base and cover. Nowhere does Bennett suggest that the flex circuit is grounded by this stiffener. While the flex circuit is physically supported by the stiffener, and is further indirectly protect from EMI noise by the stiffener, the stiffener clearly does not provide a grounding plane for the flex circuit as required by claim 16. It may be that the Office has been confused by the terminology at col. 5, line22, "grounding flex circuit support bracket." While the confusion is understandable, a careful reading of the patent makes it clear that while the bracket is both a "grounding bracket" and a "flex circuit support bracket" it in no way grounds the flex circuit. As such, the rejection simply cannot be sustained.

Reversal of the rejection of claim 12 is respectfully requested for the reasons set forth above.

Claim 6 depends from claim 1 and is allowable for at least this reason, as well as the reasons set forth above with respect to the rejection of claim 12.

Claim 13 depends from claim 12 and is allowable for at least this reason.

Rejection (4):

Claims 16 and 20 were rejected under 35 U.S.C. § 103(a) as being obvious over Bennett in view of Crane.

Claims 16 requires a flexible printed circuit with electronic circuit components mounted thereon, as well as a stiffener forming a ground plane connected to the electronic circuit components. However, Bennett does not disclose a stiffener that grounds any portion of the flex circuit or circuit board; the stiffener is designed only to provide a pathway for EMI noise by providing grounding contact between a disc drive base and cover. Nowhere does Bennett suggest that the flex circuit is grounded by this stiffener. While the flex circuit is physically supported by the stiffener, and is further

indirectly protect from EMI noise by the stiffener, the stiffener clearly does not provide a grounding plane for the flex circuit as required by claim 16. It may be that the Office has been confused by the terminology at col. 5, line 22, "grounding flex circuit support bracket." While the confusion is understandable, a careful reading of the patent makes it clear that while the bracket is both a "grounding bracket" and a "flex circuit support bracket" it in no way grounds the flex circuit. As such, the rejection of claim 16 cannot reasonably be sustained since all claim limitations are not met. While it is noted that the Office proposes to modify Bennett's device through the teachings of Crane, Crane is not applied to remedy the deficiency identified here and therefore the combination cannot be said to render claim 16 obvious any more than Bennett alone.

Reversal of the rejection of claim 16 is respectfully requested for the reasons set forth above.

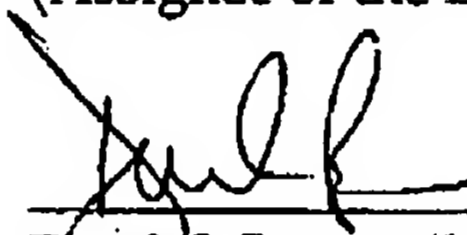
Claim 20 depends from claim 16 and is allowable for at least this reason; reversal of the rejection of this claim is also respectfully requested.

Conclusion:

Appellant maintains that present claims identify the features and benefits of the present invention clearly and concisely. The present invention as claimed is not taught or suggested by the prior art of record or any combination thereof. Therefore, it is respectfully submitted that the appealed claims are in condition for allowance, and favorable action is respectfully requested.

Respectfully submitted,

Seagate Technology LLC
(Assignee of the Entire Interest)



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Claims Appendix

1. A data storage device comprising:
 - a base plate having a top surface;
 - a spindle motor positioned on the top surface of the base supporting one or more data storage discs for rotation on the spindle motor;
 - an actuator assembly positioned on the top surface of the base plate adjacent the data storage disc; and
 - a flex printed circuit board assembly on the top surface of the base plate having actuator and motor electronic control components thereon on the top surface of the base.
2. The data storage device of claim 1 further comprising a power combo chip positioned on the flex printed circuit board assembly positioned on the top surface of the base.
3. The data storage device of claim 1 further comprising a top cover attached to the base to form an enclosed space enclosing the actuator assembly, the one or more data storage discs and the spindle motor and wherein the actuator and motor electronic control components on the flex printed circuit board assembly are outside the enclosed space.
4. The data storage device of claim 1 further comprising:
 - an interface connector attached to the flex printed circuit board and to the base plate.

5. The data storage device of claim 1 wherein the flex printed circuit board assembly comprises a flexible printed circuit and
a stiffener attached to a bottom surface of the flexible printed circuit.
6. The data storage device of claim 5 wherein the stiffener is metal and forms a ground plane for the circuitry on the flexible printed circuit.
8. The data storage device of claim 5 wherein the flexible printed circuit and the stiffener each have a coextensive portion inserted into ~~the~~ an interface connector.
9. The data storage device of claim 3 wherein the flexible printed circuit comprises a pigtail lead extending beneath the cover to the actuator assembly to connect the electronics components to the actuator assembly.
10. The data storage device of claim 3 wherein the flexible printed circuit comprises a pigtail lead extending beneath the cover to the spindle motor.
11. The data storage device of claim 10 further comprising another pigtail lead extending beneath the cover to the actuator assembly to connect the electronics components to the actuator assembly.

12. A flexible printed circuit assembly for use in a data storage device having an actuator assembly adjacent a spindle motor rotating one or more data storage discs, the assembly comprising:

- a flexible printed circuit having a pigtail lead for connection to the actuator assembly of the data storage device and a pigtail lead for connection to the spindle motor of the data storage device;
- actuator control and signal processing electronics components mounted on, and electrically connected to, the flexible printed circuit; and
- a stiffener plate coextensive with a portion of the flexible printed circuit forming a ground plane for the components on the flexible printed circuit.

13. The flexible printed circuit assembly of claim 12 further comprising:

- an interface connector attached to the flexible printed circuit and to the stiffener.

16. A printed circuit assembly comprising:

- a flexible printed circuit having one or more electronic circuit components requiring a ground and a power connection mounted thereon;
- a stiffener plate coextensive with a portion of the flexible printed circuit forming a ground plane connected to the one or more components.

20. The assembly according to claim 16 further comprising one or more discrete circuit components fastened to the flexible printed circuit and to one of the ground and power planes.

Evidence Appendix

Not Applicable

Related Proceedings Appendix

Not Applicable